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September 3, 1984

STATE DOCUMENTS COLLECTION

Alfalfa Leafcutting Bee Newsletter: Volume I, No. 4

MAY 20 1986

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FALL MANAGEMENT, EXTRACTION AND CERTAIN INSECTS PESTS

In late August or during September, bee flights and alfalfa bloom have generally diminished to a point where growers should bring in nesting material with bee cells for winter storage. Recently pollinated bloom, if present, does not have time to mature prior to harvest. Bees should be removed from shelters and stored for 3 to 4 weeks in a dry, unheated room until the cells have dried sufficiently enough to be easily extracted. This also allows young larvae to mature to the overwintering stage. Before removal from the field, laminates may be classified or marked into lots according to how the beekeeper would like them sampled (i.e. from separate fields, south or east facing houses, separate pesticide treatments, etc.).

During removal of cells from laminates be sure that the dowels of the extractor are removing cells without crushing or piercing them. If cocoons or larvae are being damaged, then the proper adjustments will need to be made. After, or as part of the extraction process, cells should be tumbled or processed with an "air cleaner" which is usually a seed cleaning machine. This will help bring down numbers of insect pests, unfinished cells, leaf pieces, chalkbrood cadavers, etc. if present. Cells may be stored in plastic bags or garbage cans which will not absorb moisture. If the overwintering

room is not mouse-proof, bags should be stored in clean metal garbage cans or other mouse proof containers.

After extraction, cells should be gradually brought down from outside or room temperature to  $36^{\circ}$  to  $40^{\circ}$ F over a 3 to 4 day period for cold storage. This temperature induces diapause (the overwintering state) and causes no mortality to larvae during storage. At freezing or below, for extended periods of time, bee mortality in loose cells will occur. Above  $40^{\circ}$ F, certain beetles, moths and other insect pests will become active if present. One pest, the checkered flower beetle, may be occurring in Montana in isolated cases. Adults are  $\frac{1}{4}$  to inch long and shiny metallic blue with either bright red or yellow markings on the wing covers. They primarily feed on pollen but will also eat small insects. Mating occurs on the flowers or on leafcutting bee nests. Eggs are laid in narrow cracks of wood or cracks of shelter walls. Eggs are pale pink, about  $\frac{1}{16}$  inch long and are laid singly in groups of up to 25 eggs. A female can lay up to 87 eggs. The mature larvae is pink to red with a black head and 2 hook like structures on the tip of the abdomen. These "worms" can be  $\frac{2}{3}$  of an inch long and will chew through  $\frac{1}{4}$  inch of wood. Larvae overwinter in all stages (sizes) and will become active above  $38^{\circ}$ F. One beetle larvae often consumes 8 bees and may destroy more than 20 prior to the adult stage. They can be particularly damaging during incubation in the spring. These pests need to be checked or controlled before they become established in Montana. Checkered flower beetles have destroyed up to 89% of bees in samples from southeastern Washington. Infestations of 33% have been reported in Oregon, 22% in Idaho and 39% in Nevada. The best control measures in loose cell systems are tumbling and hand picking the pink larvae prior to cold storage.

Two insect pests in seed fields which have caused considerable trouble this year in Montana are grasshoppers and spotted alfalfa aphids.

Materials used with varying degrees of success this year on grasshoppers have been Parathion, carbofuran (furadan), Malathion and carbaxyl (Sevin) baits. These insects are rather unpredictable. Damage from high numbers of the same types (20-30 per sq. yd.) will be obvious in one field while in another no damage is evident. Baits have worked best in strips or areas surrounding fields with little or no vegetation. For baits applied in the seed fields themselves, 50% control seems to be the best one can hope for. No bee kills have been reported with the use of these baits. Malathion has worked well on small, immature grasshoppers but seems to be lacking in control of larger or adult types. Parathion and carbofuran work well on all stages of grasshoppers but are also deadly on pollinators and beneficials. The presence of damaging numbers of grasshoppers in the field after bees have been placed is going to be a frustrating problem. As indicated in the last newsletter, best control methods are preventative. Boundary sprays combined with a clean up spray prior to bee placement have given the best results on grasshoppers.

Spotted alfalfa aphids have been treated, apparently for the first time in alfalfa seed in Montana, this year. The most effective material used during bee flight has been endosulfan (Thiodan). Cooperative Extension in Washington, Oregon and Idaho recommends a 3 day delay between an application (.5lbs/acre) and introduction of pollinators to treated fields. Growers in Montana have used endosulfan this year as an evening spray when bees are in the field with no apparent mortality to adults. This does not mean that Thiodan is necessarily safe on bees left in the field after an evening application. The grower who uses this method may have good results with one treatment and bad results with another. What effect this material as well as



other insecticides used in alfalfa seed has on post-treatment bee eggs and developing larvae has not been established, though some ground work has been laid in Nevada and Washington.

For further information contact:

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